GNU Parted User Manual

GNU Parted, version 2.1, 10 December 2009

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1 Introduction

1.1 Overview of GNU Parted

GNU Parted is a program for creating, destroying, resizing, checking and copying partitions, and the file systems on them.

This is useful for creating space for new operating systems, for reorganizing disk usage, for copying data between hard disks and for "disk imaging" — replicating an installation on another computer.

This documentation is written with the assumption that the reader has some understanding of partitioning and file systems. If you want to learn more about these, the upcoming GNU Storage Guide is recommended reading.

GNU Parted was designed to minimize the chance of data loss. For example, it was designed to avoid data loss during interruptions (like power failure) and performs many safety checks. However, there could be bugs in GNU Parted, so you should back up your important files before running Parted. Also note that reiserfs support relies on libreiserfs, which does not fulfil the aforementioned requirement. The same holds for any external tools like *`ntfsresize`*.

The GNU Parted homepage is `http://www.gnu.org/software/parted`. The library and frontend themselves can be downloaded from `ftp://ftp.gnu.org/gnu/parted`. You can also find a listing of mailing lists, notes for contributing and more useful information on the web site.

Please send bug reports to `bug-parted@gnu.org`. When sending bug reports, please include the version of GNU Parted. Please include the output from these commands (for disk '`/dev/hda`'):

```
# parted /dev/hda print unit s print unit chs print
```

Feel free to ask for help on this list — just check that your question isn't answered here first. If you don't understand the documentation, please tell us, so we can explain it better. General philosophy is: if you need to ask for help, then something needs to be fixed so you (and others) don't need to ask for help.

Also, we'd love to hear your ideas :-)

1.2 Software Required for the use of Parted

If you're installing or compiling Parted yourself, you'll need to have some other programs installed. If you are compiling Parted, you will need both the normal and devel packages of these programs installed:

- libuuid, part of the e2fsprogs package. If you don't have this, you can get it from:
  `http://web.mit.edu/tytso/www/linux/e2fsprogs.html`
  If you want to compile Parted and e2fsprogs, note that you will need to *`make install`* and *`make install-libs`* e2fsprogs.
- GNU Readline (optional), available from
  `ftp://ftp.gnu.org/gnu/readline`
  If you are compiling Parted, and you don't have readline, you can disable Parted's readline support with the *`--disable-readline`* option for `configure`.

- GNU gettext (or compatible software) for compilation, if internationalisation support is desired.

  ftp://ftp.gnu.org/gnu/gettext
- libreiserfs, if you want reiserfs support:

  http://reiserfs.osdn.org.ua

  Note that parted will automatically detect libreiserfs at runtime, and enable reiserfs support. libreiserfs is new, and hasn't been widely tested yet.

1.3 Platforms on which GNU Parted runs

Hopefully, this list will grow a lot. If you do not have one of these platforms, then you can use a rescue disk and a static binary of GNU Parted. See Section 1.6 [Static binaries], page 3.

GNU/Linux
: Linux versions 2.0 and up, on Alpha, x86 PCs, PC98, Macintosh PowerPC, Sun hardware.

GNU/Hurd
: GNU libc 2.1 or higher is required. You can probably use older versions by using the '`--disable-nls`' option. See Section 1.5 [Compiling], page 2. (Note: I think we have now dropped this requirement. TODO: check if libc 2.0 works!)

1.4 Terms of distribution for GNU Parted

GNU Parted is free software, covered by the GNU General Public License Version 2. This should have been included with the Parted distribution, in the COPYING file. If not, write to the Free Software Foundation, Inc., 51 Franklin St, Fifth Floor, Boston, MA 02110-1301, USA.

Libparted is considered part of GNU Parted. It is covered by the GNU General Public License. It is NOT released under the GNU Lesser General Public License (LGPL).

1.5 Building GNU Parted

If you want to compile GNU Parted, this is generally done with:

```
$ ./configure
$ make
```

However, there are a few options for `configure`:

`--without-readline`
: turns off use of readline. This is useful for making rescue disks, etc., where few libraries are available.

`--disable-debug`
: don't include assertions

`--disable-dynamic-loading`
: disables dynamic loading of some libraries (only libreiserfs for now, although we hope to expand this). Dynamic loading is useful because it allows you to

reuse libparted shared libraries even when you don't know if some libraries will be available. It has a small overhead (mainly linking with libdl), so it may be useful to disable it on bootdisks if you don't need the flexibility.

`--disable-fs`
: disable all file system support

`--disable-nls`
: turns off native language support. This is useful for use with old versions of glibc, or a trimmed down version of glibc suitable for rescue disks.

`--disable-shared`
: turns off shared libraries. This may be necessary for use with old versions of GNU libc, if you get a compile error about a "spilled register". Also useful for boot/rescue disks.

`--disable-Werror`
: ignore warning messages in compilation

`--enable-discover-only`
: support only reading/probing (reduces size considerably)

`--enable-mtrace`
: enable malloc() debugging

`--enable-read-only`
: disable writing (for debugging)

1.6 Using static binaries of GNU Parted

1.6.1 Introduction

If you want to run GNU Parted on a machine without GNU/Linux installed, or you want to resize a root or boot partition, you will need to use a boot disk.

Special boot disk images for GNU Parted used to be available, but with the emergence of a plethora of rescue disks and Live CDs that all include GNU Parted this is no longer necessary. However, please note that these disks often ship with out-of-date versions of Parted. To compensate for this a static binary of the latest GNU Parted version is available, which you can use thus:

1.6.2 Creating the Parted disk

1. Boot your system
2. Download '`parted-static-VERSION.tgz`' from `ftp://ftp.gnu.org/gnu/parted/static`
3. Unpack the tarball, resulting in a file called "parted.static".
4. Insert a floppy.
5. Do a low-level format on it (on GNU/Linux this can be achieved with the tool "fd-format" from the "util-linux" package. This is basically a sanity check because floppy disks often contain bad blocks.
6. Create a file system. Example:

```
$ parted /dev/fd0 mklabel loop mkpartfs ext2 0 1.4
```

7. Mount the floppy disk, e.g.,

```
$ mount -t ext2 /dev/fd0 /mnt/floppy
```

8. Copy '`parted.static`' to the floppy, e.g.,

```
$ cp parted.static /mnt/floppy
```

9. Unmount the floppy, e.g.,

```
$ umount /mnt/floppy
```

1.6.3 Using the Parted disk

1. Choose a rescue disk that suits you.
2. Boot off your rescue disk. Mount the disk you copied Parted onto.
3. Run Parted. For example,

```
# cd /mnt/floppy
# ./parted-static
```

2 Using Parted

2.1 Introduction to Partitioning

Unfortunately, partitioning your disk is rather complicated. This is because there are interactions between many different systems that need to be taken into consideration.

This manual used to introduce the reader to these systems and their working. This content has moved to the GNU Storage Guide.

2.2 Using GNU Parted

Parted has two modes: command line and interactive. Parted should always be started with:

```
# parted device
```

where *device* is the hard disk device to edit. (If you're lazy and omit the DEVICE argument, Parted will attempt to guess which device you want.)

In command line mode, this is followed by one or more commands. For example:

```
# parted /dev/sda resize 1 52Mb 104Mb mkfs 2 fat16
```

Options (like `--help`) can only be specified on the command line.

In interactive mode, commands are entered one at a time at a prompt, and modify the disk immediately. For example:

```
(parted) resize 1 52.0005Mb 104.5Mb
(parted) mkfs 2 fat16
```

Unambiguous abbreviations are allowed. For example, you can type "p" instead of "print", and "resi" instead of "resize". Commands can be typed either in English, or your native language (if your language has been translated). This may create ambiguities. Commands are case-insensitive.

Numbers indicating partition locations can be whole numbers or decimals. The suffix selects the unit, which may be one of those described in Section 2.4.18 [unit], page 13, except CHS and compact. If no suffix is given, then the default unit is assumed. Negative numbers count back from the end of the disk, with "-1s" indicating the end of the disk. Parted will compute sensible ranges for the locations you specify (e.g. a range of +/- 500 MB when you specify the location in "G"). Use the sector unit "s" to specify exact locations.

If you don't give a parameter to a command, Parted will prompt you for it. For example:

```
(parted) resize 1
Start? 0Gb
End? 40Gb
```

Parted will always warn you before doing something that is potentially dangerous, unless the command is one of those that is inherently dangerous (viz., rm, mklabel and mkfs). For example, if you attempt to shrink a partition "too much" (i.e., by more than the free space available), Parted will automatically reduce the shrinkage so that the partition is the smallest it can be without losing data. If this size is significantly different from the size requested, Parted will warn you. Since many partitioning systems have complicated

constraints, Parted will usually do something slightly different to what you asked. (For example, create a partition starting at 10.352Mb, not 10.4Mb) If the calculated values differ too much, Parted will ask you for confirmation.

Currently ext3 filesystem functionality does not work. To manage ext3 type filesystems use tools like resize2fs or mke2fs. Note that the currently supported ext2 filesystem will be deprecated once ext3 support is finalized. Further note that ext3 support will have limited functionality that is yet to be defined. Use tools like resize2fs (8) and mke2fs (8) to manage these types of filesystems.

2.3 Command Line Options

When invoked from the command line, Parted supports the following syntax:

```
# parted [option] device [command [argument]]
```

Available options and commands follow. For detailed explanations of the use of Parted commands, see Section 2.4 [Command explanations], page 6. Options begin with a hyphen, commands do not:

Options:

'`-h`'
'`--help`' display a help message

'`-s`'
'`--script`'
: never prompt the user

'`-a alignment-type`'
'`--align alignment-type`'
: Set alignment for newly created partitions, valid alignment types are: none, cylinder, minimal and optimal.

'`-v`'
'`--version`'
: display the version

2.4 Parted Session Commands

GNU Parted provides the following commands:

2.4.1 align-check

`align-check` *`align-type n`* [Command]

Determine whether the starting sector of partition *n* meets the disk's selected alignment criteria. *align-type* must be '`minimal`', '`optimal`' or an abbreviation. When in script mode, if the partition does not meet the alignment requirement, exit with status 1; otherwise (including on older kernels for which alignment data is not available), continue processing any remaining commands. Without '`--script`', print either '*N* `aligned`' or '*N* `not aligned`'.

Example:

```
(parted) align-check minimal 1
1 aligned
```

2.4.2 check

`check` *number* [Command]

Checks if the file system on partition *number* has any errors.

Example:

```
(parted) check 1
```

Check the file system on partition 1.

2.4.3 cp

`cp` [*from-device*] *from-number to-number* [Command]

Copies the file system on the partition *from-number* to partition *to-number*, deleting the original contents of the destination partition.

An optional device parameter, *from-device* can be given, which specifies which device the source partition is on.

Supported file systems:

- ext2 (provided the destination partition is larger than the source partition)
- fat16, fat32
- linux-swap (equivalent to mkswap on destination partition)
- reiserfs (if libreiserfs is installed)

Example:

```
(parted) cp /dev/hdb 2 3
```

Copy partition 2 of '`/dev/hdb`' (i.e., '`/dev/hdb2`') to partition on 3, on the device Parted was loaded with, destroying the original contents of partition 3.

2.4.4 help

`help` [*command*] [Command]

Prints general help, or help on *command*.

Example:

```
(parted) help resize
```

Print help for the resize command.

2.4.5 mklabel

`mklabel` *label-type* [Command]

Creates a new disk label, of type *label-type*. The new disk label will have no partitions. This command (normally) won't technically destroy your data, but it will make it basically unusable, and you will need to use the rescue command (see Chapter 3 [Related information], page 15) to recover any partitions. Parted works on all partition tables.[1]

label-type must be one of these supported disk labels:

[1] Everyone seems to have a different word for "disk label" — these are all the same thing: partition table, partition map.

- bsd
- loop (raw disk access)
- gpt
- mac
- msdos
- pc98
- sun

Example:

```
(parted) mklabel msdos
```

Create an MS-DOS disk label. This is still the most common disk label for PCs.

2.4.6 mkfs

`mkfs` *number fs-type* [Command]

Makes a file system *fs-type* on partition *number*, destroying all data that resides on that partition.

Supported file systems:

- ext2
- fat16, fat32
- linux-swap
- reiserfs (if libreiserfs is installed)

Example:

```
(parted) mkfs 2 fat32
```

Make a *fat32* file system on partition 2.

2.4.7 mkpart

`mkpart` [*part-type fs-type name*] *start end* [Command]

Creates a new partition, *without* creating a new file system on that partition. This is useful for creating partitions for file systems (or LVM, etc.) that Parted doesn't support. You may specify a file system type, to set the appropriate partition code in the partition table for the new partition. *fs-type* is required for data partitions (i.e., non-extended partitions). *start* and *end* are the offset from the beginning of the disk, that is, the "distance" from the start of the disk.

part-type is one of '`primary`', '`extended`' or '`logical`', and may be specified only with '`msdos`' or '`dvh`' partition tables. A *name* must be specified for a '`gpt`' partition table. Neither *part-type* nor *name* may be used with a '`sun`' partition table.

fs-type must be one of these supported file systems:

- ext2
- fat16, fat32
- hfs, hfs+, hfsx
- linux-swap

- NTFS
- reiserfs
- ufs

Example:

```
(parted) mkpart logical 0.0 692.1
```

Create a logical partition that will contain an ext2 file system. The partition will start at the beginning of the disk, and end 692.1 megabytes into the disk.

2.4.8 mkpartfs

`mkpartfs` *part-type fs-type start end* [Command]

Creates a new partition of type *part-type* with a new file system of type *fs-type* on it. The new partition will start *start* megabytes, and end *end* megabytes from the beginning of the disk. Do not use this command to recover a deleted partition (use mkpart instead). Using this command is discouraged. Instead use mkpart to create an empty partition, and then use external tools like mke2fs (8) to create the filesystem.

part-type is one of: primary, extended, logical. Extended and logical are only used for msdos and dvh disk labels.

fs-type must be one of these supported file systems:

- ext2
- fat16, fat32
- linux-swap
- reiserfs (if libreiserfs is installed)

Example:

```
(parted) mkpartfs logical ext2 440 670
```

Make a logical partition and write an ext2 file system, starting 440 megabytes and ending 670 megabytes from the beginning of the disk.

2.4.9 move

`move` *number start end* [Command]

Moves partition on the disk, by moving its beginning to *start*. You can't move a partition so that the old and new positions overlap. That is, you can only move partitions into free space. If you want to resize a partition in-place, use `resize`.

Move never changes the partition number.

Supported file systems:

- ext2 (provided the destination partition is larger than the source partition)
- fat16, fat32
- linux-swap
- reiserfs (if libreiserfs is installed)

Example:

```
(parted) move 2 150M 500M
```

Move the partition numbered 2 so that it begins 150 megabytes from the start of the disk, and ends 500 megabytes from the start.

2.4.10 name

`name` *number name* [Command]

Sets the name for the partition *number* (GPT, Mac, MIPS and PC98 only). The name can be placed in quotes.

Example:

```
(parted) name 2 'Secret Documents'
```

Set the name of partition 2 to 'Secret Documents'.

2.4.11 print

`print` [*number*] [Command]

Displays the partition table on the device parted is editing, or detailed information about a particular partition.

Example:

```
(parted) print
Disk geometry for /dev/hda: 0.000-2445.679 megabytes
Disk label type: msdos
Minor    Start       End     Type      Filesystem  Flags
1          0.031    945.000  primary   fat32       boot, lba
2        945.000   2358.562  primary   ext2
3       2358.562   2445.187  primary   linux-swap
(parted) print 1
Minor: 1
Flags: boot, lba
File System: fat32
Size:            945.000Mb (0%)
Minimum size:     84.361Mb (0%)
Maximum size:   2445.679Mb (100%)
```

2.4.12 quit

`quit` [Command]

Quits Parted.

It is only after Parted exits that the Linux kernel knows about the changes Parted has made to the disks. However, the changes caused by typing your commands will *probably* be made to the disk immediately after typing a command. However, the operating system's cache and the disk's hardware cache may delay this.

2.4.13 rescue

`rescue` *start end* [Command]

Rescue a lost partition that used to be located approximately between *start* and *end*. If such a partition is found, Parted will ask you if you want to create a partition for it. This is useful if you accidently deleted a partition with parted's rm command, for example.

Example:

```
(parted) print
Disk geometry for /dev/hdc: 0.000-8063.507 megabytes
Disk label type: msdos
Minor    Start       End     Type      Filesystem  Flags
1          0.031   8056.032  primary   ext3
(parted) rm
Partition number? 1
(parted) print
Disk geometry for /dev/hdc: 0.000-8063.507 megabytes
Disk label type: msdos
Minor    Start       End     Type      Filesystem  Flags
```

OUCH! We deleted our ext3 partition!!! Parted comes to the rescue...

```
(parted) rescue
Start? 0
End? 8056
Information: A ext3 primary partition was found at 0.031MB ->
8056.030MB.  Do you want to add it to the partition table?
Yes/No/Cancel? y
(parted) print
Disk geometry for /dev/hdc: 0.000-8063.507 megabytes
Disk label type: msdos
Minor    Start       End     Type      Filesystem  Flags
1          0.031   8056.032  primary   ext3
```

It's back! :)

2.4.14 resize

`resize` *number start end* [Command]

Resizes the partition with number *number*. The partition will start *start* from the beginning of the disk, and end *end* from the beginning of the disk. resize never changes the partition number. Extended partitions can be resized only so long as the new extended partition completely contains all logical partitions.

Note that Parted can manipulate partitions whether or not they have been defragmented, so you do not need to defragment the disk before using Parted.

Supported file systems:

- ext2 – restriction: the new *start* must be the same as the old *start*.
- fat16, fat32
- hfs, hfs+, hfsx – restriction: the new *start* must be the same as the old *start* and the new *end* must be smaller than the old *end*.
- linux-swap
- reiserfs (if libreiserfs is installed)

Example:

```
(parted) resize 3 200M 850M
```

Resize partition 3, so that it begins 200 megabytes and ends 850 megabytes from the beginning of the disk.

2.4.15 rm

`rm` *number* [Command]

Removes the partition with number *number*. If you accidently delete a partition with this command, use mkpart (*not* mkpartfs) to recover it. Also, you can use the gpart program (see Chapter 3 [Related information], page 15) to recover damaged disk labels.

Note for msdos disk labels: if you delete a logical partition, all logical partitions with a larger partition number will be renumbered. For example, if you delete a logical partition with a partition number of 6, then logical partitions that were number 7, 8 and 9 would be renumbered to 6, 7 and 8 respectively. This means, for example, that you have to update '`/etc/fstab`' on GNU/Linux systems.

Example:

```
(parted) rm 3
```

Remove partition 3.

2.4.16 select

`select` *device* [Command]

Selects the device, *device*, for Parted to edit. The device can be a Linux hard disk device, a partition, a software RAID device or LVM logical volume.

Example:

```
(parted) select /dev/hdb
```

Select '`/dev/hdb`' (the slave device on the first ide controller on Linux) as the device to edit.

2.4.17 set

`set` *number flag state* [Command]

Changes a flag on the partition with number *number*. A flag can be either "on" or "off". Some or all of these flags will be available, depending on what disk label you are using:

'`bios_grub`'
: (GPT) - Enable this to record that the selected partition is a GRUB BIOS partition.

'`boot`'
: (Mac, MS-DOS, PC98) - should be enabled if you want to boot off the partition. The semantics vary between disk labels. For MS-DOS disk labels, only one partition can be bootable. If you are installing LILO on a partition that partition must be bootable. For PC98 disk labels, all ext2 partitions must be bootable (this is enforced by Parted).

'`lba`'
: (MS-DOS) - this flag can be enabled to tell MS DOS, MS Windows 9x and MS Windows ME based operating systems to use Linear (LBA) mode.

'`root`'
: (Mac) - this flag should be enabled if the partition is the root device to be used by Linux.

'`swap`' (Mac) - this flag should be enabled if the partition is the swap device to be used by Linux.

'`hidden`' (MS-DOS, PC98) - this flag can be enabled to hide partitions from Microsoft operating systems.

'`raid`' (MS-DOS) - this flag can be enabled to tell linux the partition is a software RAID partition.

'`LVM`' (MS-DOS) - this flag can be enabled to tell linux the partition is a physical volume.

'`PALO`' (MS-DOS) - this flag can be enabled so that the partition can be used by the Linux/PA-RISC boot loader, palo.

'`PREP`' (MS-DOS) - this flag can be enabled so that the partition can be used as a PReP boot partition on PowerPC PReP or IBM RS6K/CHRP hardware.

The print command displays all enabled flags for each partition.

Example:

```
(parted) set 1 boot on
```

Set the '`boot`' flag on partition 1.

2.4.18 unit

`unit` *unit* [Command]

Selects the current default unit that Parted will use to display locations and capacities on the disk and to interpret those given by the user if they are not suffixed by an *unit*.

unit may be one of:

'`s`' sector (n bytes depending on the sector size, often 512)

'`B`' byte

'`kB`' kilobyte (1000 bytes)

'`MB`' megabyte (1000000 bytes)

'`GB`' gigabyte (1000000000 bytes)

'`TB`' terabyte (1000000000000 bytes)

'`%`' percentage of the device (between 0 and 100)

'`cyl`' cylinders (related to the BIOS CHS geometry)

'`chs`' cylinders, heads, sectors addressing (related to the BIOS CHS geometry)

'`compact`' This is a special unit that defaults to megabytes for input, and picks a unit that gives a compact human readable representation for output.

The default unit apply only for the output and when no unit is specified after an input number. Input numbers can be followed by an unit (without any space or other character between them), in which case this unit apply instead of the default unit for this particular number, but CHS and cylinder units are not supported as a suffix.

If no suffix is given, then the default unit is assumed. Parted will compute sensible ranges for the locations you specify (e.g. a range of +/- 500 MB when you specify the location in "G") and will select the nearest location in this range from the one you wrote that satisfies constraints from both the operation, the filesystem being worked on, the disk label, other partitions and so on. Use the sector unit "s" to specify exact locations (if they do not satisfy all onstraints, Parted will ask you for the nearest solution). Note that negative numbers count back from the end of the disk, with "-1s" pointing to the end of the disk.

Example:

```
(parted) unit compact
(parted) print
Disk geometry for /dev/hda: 0kB - 123GB
Disk label type: msdos
Number  Start   End     Size    Type      File system  Flags
1       32kB    1078MB  1077MB  primary   reiserfs     boot
2       1078MB  2155MB  1078MB  primary   linux-swap
3       2155MB  123GB   121GB   extended
5       2155MB  7452MB  5297MB  logical   reiserfs
(parted) unit chs print
Disk geometry for /dev/hda: 0,0,0 - 14946,225,62
BIOS cylinder,head,sector geometry: 14946,255,63.  Each cylinder
is 8225kB.
Disk label type: msdos
Number  Start       End         Type      File system  Flags
1       0,1,0       130,254,62  primary   reiserfs     boot
2       131,0,0     261,254,62  primary   linux-swap
3       262,0,0     14945,254,62 extended
5       262,2,0     905,254,62  logical   reiserfs
(parted) unit mb print
Disk geometry for /dev/hda: 0MB - 122942MB
Disk label type: msdos
Number  Start   End     Size    Type      File system  Flags
1       0MB     1078MB  1077MB  primary   reiserfs     boot
2       1078MB  2155MB  1078MB  primary   linux-swap
3       2155MB  122935MB 120780MB extended
5       2155MB  7452MB  5297MB  logical   reiserfs
```

3 Related information

If you want to find out more information, please see the GNU Parted web site.

These files in the Parted distribution contain further information:

- *ABOUT-NLS* - information about using Native Language Support, and the Free Translation Project.
- *AUTHORS* - who wrote what.
- *ChangeLog* - record of changes made to Parted.
- *COPYING* - the GNU General Public License, the terms under which GNU Parted may be distributed.
- *COPYING.DOC* - the GNU Free Documentation Licence, the term under which Parted's documentation may be distributed.
- *INSTALL* — how to compile and install Parted, and most other free software

Appendix A Copying This Manual

A.1 GNU Free Documentation License

Version 1.1, March 2000

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0. PREAMBLE

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Appendix B This manual's history

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Initial Texinfo formatting by Richard M. Kreuter, 2002.

Maintainance by Andrew Clausen from 2002 to 2005 and by Leslie P. Polzer from July 2005 onwards.

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